The formation of ripple marks, for instance, wants fuller explanation than the statement that "they owe their origin to a wave-like motion set up in the semifluid sediment by the water passing over it."

The work is illustrated by a large number of diagrammatic sketches by the author and photographs by members of the staff of the Geological Survey. As examples, we reproduce the pictures of two common phenomena which have many points of general resemblance to one another but a very different origin. Plate xxxix. represents a fissure the strata on either side of which have been relatively displaced by earth movements, either repeatedly in one direction or with a to-and-fro motion, so that the walls of the fissure have been rubbed smooth, fluted, and polished by the movement. The triturated rock and the fragments broken off fill the crack, and this débris is often penetrated by mineral matter and consolidated into a mass harder than the rocks through which it passes. The walls of the fissure are sometimes altered mechanically and by infiltering water to a considerable depth.

In Plate xliv., on the other hand, we see a rift in the rocks filled with matter which has welled up from deep-seated rock which has become molten. In this case, also, the immediately adjoining portion of the rock which it traverses is altered, and very commonly shows slickensides when earth movements have acted upon these two rocks of such different tenacity and hardness; but the composition of the traversing rocks is so unlike in the two cases, and the character of the marginal alterations so dissimilar, that there is seldom any room for doubt as to the origin of each.

Our author has wisely avoided most of the shibboleths which it is the fashion for specialists to introduce into their explanations of the simplest phenomena, but though students may escape the interruption of having to consider the exact application of mylonisation and schillerisation, which are not in the index, though one is found in the text, they must learn the meaning of such terms as synclinorium or geanticline. Difficulties and absurdities in nomenclature are perhaps characteristic of the present phase of scientific literature, and our author has been wonderfully considerate in this matter, and has given us a very useful handbook, admirable in the freshness and terseness of its descriptions and the clearness and abundance of its illustrations.

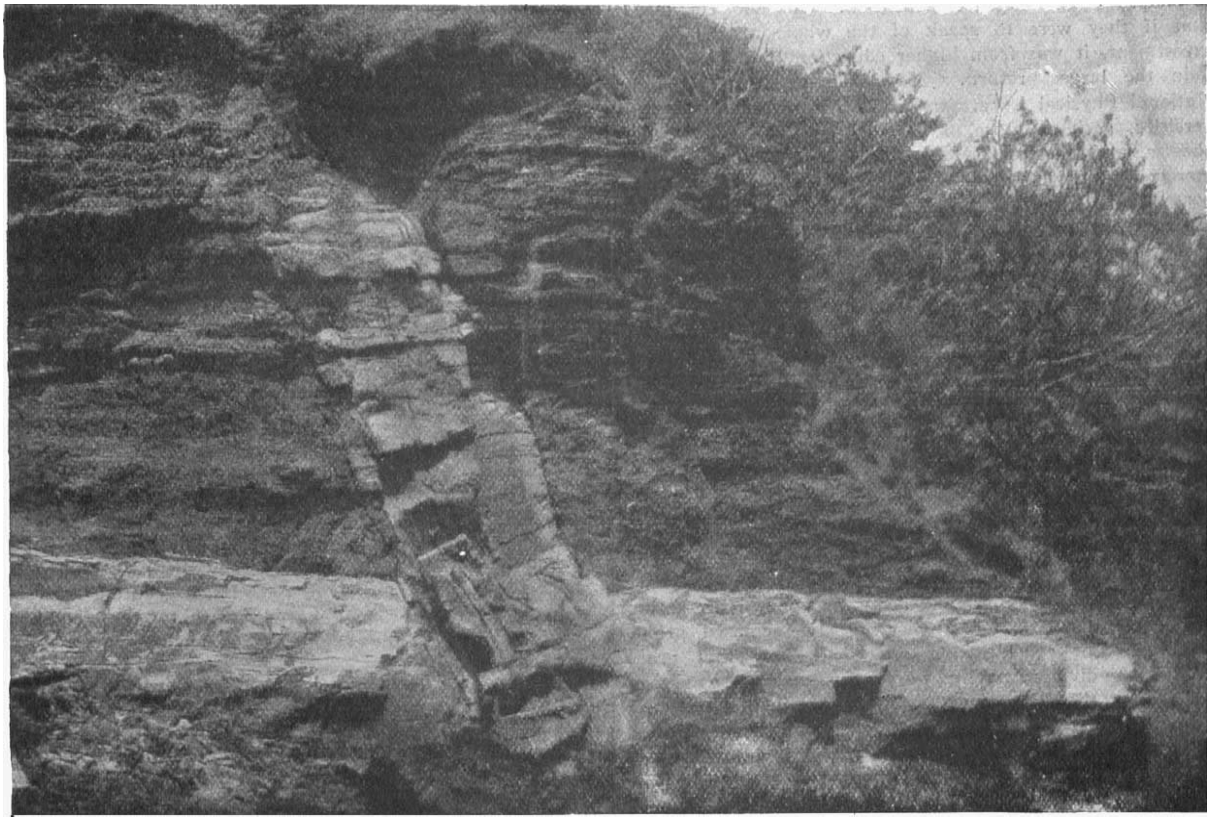

*Photo. by H.M. Geological Survey.*

FIG. 2.—Basalt Dyke Cutting Sandstone and Shale, Kilbride Bennan, Arran. (From "Structural and Field Geology," J. Geikie.)

## NOTES.

AMONG those who are the recipients of the King's birthday honours we notice the following:—Lord Rayleigh, O.M., F.R.S., has been made a Privy Councillor; Knighthoods have been conferred upon Prof. T. McCall Anderson, of the University of Glasgow; Mr. E. W. Brabrook, C.B., formerly Registrar of Friendly Societies; Dr. A. B. W. Kennedy, F.R.S., Emeritus professor of engineering and mechanical technology at University College, London, and president of the Admiralty Committee on Machinery Designs; Dr. Boverton Redwood; and Dr. W. J. Smyly, president of the Royal College of Physicians, Ireland. Colonel D. Bruce, F.R.S., has been made a Knight Commander of the Bath. Dr. W. T. Prout, principal medical officer, colony of Sierra Leone, and Dr. J. W. Robertson, late Commissioner of Agriculture and Dairying of the Dominion of Canada, have been made C.M.G.'s. The honour of Knight Bachelor has been conferred upon Dr. E. S. Stevenson, member of the medical council of the Cape of Good Hope; and Mr. Philip Watts, F.R.S., Director of Naval Construction, is made an ordinary member of the Civil Division of the Second Division, or Knight Commander, of the Order of the Bath.

A meeting of Members of Parliament, presided over by Mr. Haldane, met on Tuesday last in a committee room of the House of Commons to consider the question of a request for an additional State grant to the National Physical Laboratory. Dr. Glazebrook having made a statement as to the aims and needs of the laboratory, was followed by Mr. Chamberlain, who in the course of his remarks said that the real problem of the nation was how to improve our highest education. He felt convinced that if they were to speak of the whole matter as an investment, it was from higher education that they would gain the largest return. He asked in what way the National Physical Laboratory was distinct from other universities, such as those of Birmingham, Liverpool, Manchester, and Sheffield. He asked this because it was not merely the object of the universities to educate young persons; it was their object to carry on post-graduate research in the largest possible way—to make precisely the experiments which the laboratory was making. They did not want in any way to discourage that work in these separate universities; they did not want to centralise any branch of scientific work. He had himself rather a horror of central institutions, and he had a great belief in the freedom and the competition of a number of separate centres. He was sure that there was no idea of injurious competition in the minds of the promoters of the meeting; but he would like to be certain that it might not have that effect. After all, they were all more or less dependent, and they would be increasingly dependent, upon State aid, of which they had had very little up to the present. Were the universities, each of them, to apply separately and frighten the Treasury, or were they to put their forces together, and go as one body representing the whole and ask for a very largely increased grant, leaving it for consideration afterwards how that grant should be divided? Why were they making a special demand at that time for that particular institution? He was all in favour of giving assistance to any institution of the kind. But he should like to know in what way this was to be distinguished from the University of Liverpool or any of the others where they were carrying on the work of physical research. He would even ask why the promoters of this institution should operate alone—whether they would not do much more if they all came together. In that case they would, of course, have very much larger Parliamentary support. If each institution was to ask for what it wanted he was afraid the chances of success would not be great. He might be considered to be throwing cold water on the matter at the beginning, but as a fact he most entirely sympathised with the general object. He thought that such an institution was absolutely necessary, and if there were no others, then he would say most distinctly that it would have a special claim upon them. But as there were, and as they were all in their infancy, he wished to know in what way it was thought best to treat the matter when they approached the Government, whether as a whole on behalf of scientific instruction generally or whether on behalf of the claims of that particular institution. The chairman said they were all interested in what Mr. Chamberlain had said, and his suggestion of a collective movement in favour of the highest education. He thought the work that the National Physical Laboratory was doing could not be organised in connection with any of the universities. The following resolution was then put to the meeting and carried unanimously:—"That this meeting, being satisfied of the necessity of further State aid to the National Physical Laboratory, at Teddington, as regards both equipment and maintenance, requests the chairman and conveners of this meeting to prepare and present a memorial to the Chancellor of the Exchequer asking for such additional aid, and that the memorial be signed by members here present or who, being absent, may be in sympathy with its objects." Mr. Chamberlain, who had to leave before a decision was arrived at, said that if the meeting decided in favour of the resolution his name might be attached to it.

On Monday last Mr. Ailwyn Fellowes, President of the Board of Agriculture, was waited upon by a deputation from the Pharmaceutical Society respecting the proposed legislation to extend to other than chemists the right of selling poisonous products used in agriculture and horticulture. It was argued on behalf of the society that it would be dangerous to the public to allow any one to sell poisonous articles; that there was no difficulty in the way of farmers or horticulturists getting the articles through a chemist as cheaply as through any other person; and the public would be safeguarded by the special knowledge of the chemist and druggist. In reply, the President of the Board of Agriculture said he had received an enormous number of resolutions from all over the country in favour of a relaxation of the present law. The new regulations under the proposed Bill would provide:—(1) that no poisonous substance shall be kept in any shop or premises where articles of food are stored or kept for sale; (2) that poisons must be kept in a separate cupboard from other goods; (3) all poisons shall be sold in an enclosed vessel, labelled with the word "Poison"; (4) liquid poisons shall be sold only in bottles or tins easily distinguishable by touch from ordinary bottles or tins; (5) in granting licences the local authority shall have regard to the facilities already existing in the neighbourhood for the purchase of poisonous compounds.

According to the Berlin correspondent of the *Daily Chronicle,* Dr. Robert Koch has written from German East Africa stating that he has been studying the nature, habits, and anatomy of the tsetse fly, and that he has discovered a certain parasite in the fly to which he attributes the disease to which the cattle bitten by the fly succumb.

The death is announced, at the age of fifty-five years, of Prof. von Mikulicz-Radecki, of the University of Breslau, well known as a surgeon and for his numerous papers and memoirs on surgical subjects. About a year ago he delivered the Cavendish lecture before the West London Medico-chirurgical Society, and last year he was the president of the surgical section of the German Association of Men of Science and Medical Men.

The death is announced of Prof. P. T. Cleve, of Upsala, on June 18. He was born in 1840, and was the leading exponent of chemical research in Sweden. His hydrographical investigations were also of great importance. He was an honorary member of the Chemical Society.

The Barnard medal of Columbia University has just been awarded to Prof. H. Becquerel for "important discoveries in the field of radio-activity, and for his original discovery of the so-called dark rays from uranium, which discovery has been the basis of subsequent research into the laws of radio-activity, and of our present knowledge of the same." The medal has been previously awarded to Lord Rayleigh, Sir William Ramsay, and Prof. Röntgen.

A PORTRAIT of Prof. W. Osler has been presented to the University of Pennsylvania by the members of the classes which from 1885 to 1891 studied under Prof. Osler when he occupied the chair of clinical medicine at the university

A MEDAL has been struck to commemorate the successful completion of the Simplon Tunnel. On one side of the medal is a figure of Mercury and a locomotive emerging from the tunnel, with the inscription "Aux Collaborateurs et Ouvriérs du Percement du Simplon"; on the other is a representation of the meeting of the workmen when the last obstacle had been broken down, and bears the words "Souvenir de la Rencontre des Galeries, Fevr. 1905."

BUSTS of Joseph Lancaster and Michael Faraday—the gift of Mr. Passmore Edwards—were unveiled on Wednesday of last week in the entrance hall of the Borough Polytechnic Institute by Prof. Silvanus P. Thompson, F.R.S., who delivered an address.

To commemorate the anniversary of the one hundred and twenty-fifth birthday of Audubon, the American Museum of Natural History has placed on exhibition a collection of Audubon relics, among which is the portfolio in which Audubon carried specimen plates while securing subscribers to his great work, together with sketches and finished plates.

A SCHEME for the establishment of a Central Research Institute at Kasauli, and a laboratory for scientific, medical, and sanitary work at the headquarters of each provincial Indian Government, to provide more adequate means for the scientific study of etiology and the nature of the diseases of the country, has been published. It is hoped that when the project has been developed, not only will it be no longer necessary for officers to go to Europe to study the bacteriology and parasitology of tropical diseases, but that workers from England and the European Continent will avail themselves of the Indian laboratories and the unrivalled material for study which the diseases of the country afford. The scheme has the approval of the Secretary of State, and the Government of India proposes to appoint as the first director of the Central Research Institute Lieut.-Colonel Semple, M.D., well known for his work in connection with the Pasteur Institute of India.

A NEW society, to be known as the Harvey Society, has been established in New York under the patronage of the New York Academy of Medicine. Its purpose is the diffusion of scientific knowledge of anatomy, physiology, bacteriology, pathology, pharmacology, and physiological and pathological chemistry by public lectures given by men who are workers in the subjects presented. Each lecture is intended to represent the state of modern knowledge concerning the topic treated, and will be addressed to the general medical profession who are interested in the scientific side of medicine. The president is Dr. Graham Lusk. The members of the society consist of two classes, active and associate members. Active members are laboratory workers in the medical sciences residing in New York; associate members are such persons as may be in sympathy with the objects of the society, and reside in New York. The first course of lectures will be given at the Academy of Medicine on Saturday evenings during the winter of the years 1905–6.

A CONVERSAZIONE took place at King's College, London, on Thursday last, when many scientific and other exhibits were on view. An interesting item was a set of various forms of glow-lamps, a demonstration of which was given by Prof. E. Wilson in the Siemens electrical engineering laboratory, and which included mercury-vapour, Nernst, tantalum, and osmium lamps. There was also an exhibition of crystallisation shown on the screen by Prof. Herbert Jackson.

THE annual conversazione of the Institution of Electrical Engineers was held on June 29 at the British Museum (Natural History), South Kensington. It was attended by upwards of 1000 guests.

THE third International Electric Tramway and Railway Exhibition was opened at the Agricultural Hall, Islington, on Monday last by Lord Derby.

THE annual general meeting of the Society of Chemical Industry will begin in London on Monday next, June 10. The society numbers among its members some 1500 Americans, and at the last annual meeting, which, with special reference to the St. Louis Exhibition, was held in the United States, an American, Dr. W. H. Nichols, was elected president in succession to Sir William Ramsay. The American visit was a great success, and the British members of the society have looked forward to the time when they would be able to welcome in Great Britain their president and American and Canadian co-members. The proceedings in connection with the forthcoming meeting have therefore been specially arranged in view of this return visit. Dr. Nichols has already arrived in England, and we understand that the guests of the society will number in all about 120. A lengthy and interesting programme has been arranged.

THE sixty-fourth annual meeting of the Medico-psychological Association of Great Briain and Ireland will be held at 11 Chandos Street, Cavendish Square, on July 20 and 21 under the presidency of Dr. T. Outterson Wood. The annual dinner of the association is to take place on July 30 at the Whitehall Rooms.

THE American Anthropological Association is to meet in San Francisco, Cal., from August 29 to 31 next under the presidency of Prof. F. W. Putnam, when papers relating to ethnology, archæology, prehistoric man, physical anthropology, linguistics, and general anthropology will be read. The museum of the department of anthropology of the University of California at the affiliated colleges in San Francisco, which has recently been installed, but not yet opened to the public, will be the headquarters of the association.

A PRELIMINARY circular has been issued to announce that the tenth International Geological Conference will be held in 1906 in Mexico. An executive committee has been appointed, with M. José G. Aguilera, director of the National Geological Institute of Mexico, as president, and M. Ezequiel Ordóñez, assistant director of the same institution, general secretary. It is expected that the congress will open on September 6, 1906, and last for eight days.

THE Postmaster-General again directs attention to the fact that pathological specimens and articles of a similar nature may be forwarded only by registered letter post and in proper cases. The Post Office regulations provide that any deleterious liquid or substance sent by post must be enclosed in a receptacle hermetically sealed, which receptacle must itself be placed in a strong wooden, leathern, or metal case, in such a way that it cannot shift about, and with a sufficient quantity of some absorbent material (such as sawdust or cotton wool) so packed about the receptacle as absolutely to prevent any possible leakage from the packet in the event of damage to the receptacle. The packet must also be marked "Fragile with care."

An exhibition of the results obtained last year by Prof. Flinders Petrie and his coadjutors in the field of Egyptian archæology was opened at University College, Gower Street, on Thursday last, and will remain on view for a month. Last winter excavations were carried on in the peninsula of Sinai. At Sarabit el Khadem the mines were of turquoise, and no copper was found. The interesting feature on this site is the evidence of the Semitic—not Egyptian—worship which was practised. The whole region is scattered over with shelters for pilgrims, usually containing a Bethel stone, some of which have Egyptian inscriptions of the twelfth dynasty. The pilgrims came for oracular dreams like Jacob's, and the shelters are only in the region of the temple. They are quite distinct from the miners' dwellings, such as are common at Wady Maghara. This Bethel custom is a special feature of Semitic belief, and is quite unknown in Egypt. The temple at Sarabit was originally a sacred cave—perhaps as early as Seneferu. It was carved by Amenemhat III., and furnished with altars for the worship of Hathor. In front of it, on the edge of the hill, was an enormous mass of ashes of burnt offerings, showing the burnt sacrifices on high places familiar to Semitic worship. The temple was extended over these burnt offerings by Tahutmes III and other kings until Sety I. Of the temple itself a beautiful and instructive model is shown, the scale being one-fiftieth. The whole length of the building is nearly 250 feet. Though it has been known since the time of Niebuhr, no clearance had been made; but now many new features have been brought to light from under the rubbish. The primitive shrine of Hathor was a rock cave, and the discovery of a hawk with the finely cut name of Seneferu makes it probable that the shrine is as old as the third dynasty.

It is announced in the *Electrician* that as a result of the successful experiments with the De Forest wireless telegraphy in moving trains, the Chicago and Alton Railway will supply wireless telegraphy apparatus on its two express trains running daily between Chicago and St. Louis, and ultimately on its whole system. Messages were received while the train was running at fifty miles per hour. For some time while the train was approaching the Mississippi River above the elevated stretch leading to Merchants' Bridge, the increase in strength of the signals was very marked, but when the train entered the framework of the bridge it was found that signals became almost imperceptible owing to the screening action of the bridge. It was observed also that the signals were stronger when the train was broadside on to the transmitting station and running at right angles to it. The fact that the radiations were following the course of the river in preference to overland paths was very marked as the train pulled out of Alton, Illinois. At one point the track runs within a few hundred feet of the river, and at this point the signals from St. Louis, thirty miles away, which had just previously become very weak, were increased in intensity to a surprising degree. No difficulty seems to have been experienced even when the train was many miles from the transmitting station and was threading through the yards and sidings of Chicago, completely hidden by large elevators and steel structures of every description.

The New York correspondent of the *Lancet* states that a subcommittee of twenty-one coloured physicians and clergymen has been organised by the New York Charity Organisation Society's Committee on the Prevention of Tuberculosis to fight tuberculosis among the coloured people of New York. The New York health board is cooperating with the movement, and has placed its dispensary under the supervision of the medical members of the subcommittee for three evenings a week. A course of illustrated lectures treating of tuberculosis will be given shortly in the churches for coloured congregations. It is stated that there are between 60,000 and 65,000 coloured persons in New York city, and that their death-rate from tuberculosis is 5·33 per 1000, as against 2·37 per 1000 among the whites.

The first part of the Home Office "Mines and Quarries: General Report and Statistics for 1904" has just been issued. The total number of persons employed at the mines of the United Kingdom was 877,057, of whom 847,553 worked at the 3333 mines under the Coal Mines Act and 29,504 at the 673 mines under the Metalliferous Mines Act. The total number at coal mines is the highest recorded since 1873, and that at metalliferous mines the lowest. The output included 232,428,272 tons of coal, 3,043,045 tons of fireclay, 7,557,733 tons of ironstone, and 2,333,062 tons of oil shale. The coal production is the highest recorded. The deaths from accidents amounted to 1055 in collieries and 35 in metalliferous mines, the death rate per 1000 persons employed being 1·24 in the former case and 1·19 in the latter. It is gratifying to note that the former rate has never been lower.

No. 21 of the *Publications of the Earthquake Investigation Committee* (Tokyo) contains a lengthy paper by Prof. Omori on horizontal pendulum observations at Tokyo; the most interesting of the results is the conclusion that the first movement is usually towards the origin in the case of near or moderately distant earthquakes, but in a small proportion of the records it is away from the origin. The author attributes this difference to a distinction in the cause of the earthquakes, the first type being due to the sudden collapse of a subterranean cavity, or the crushing down of a horizontal stratum, and the second type to the sudden splitting asunder or widening of a vertical cavity by the expansive action of steam or gases. In another part of the paper, however, he points out that in the case of artificial earthquakes caused by explosions, the first movement is outwards if these take place on the surface of the ground, but inwards if the explosive is buried at some little depth. Other points which are commented on are the resemblance between the records of earthquakes of similar intensity and originating in the same region, and the occasional occurrence of long-period undulations combined with shorter-period vibrations in the first phase of distant earthquakes.

The investigations of the relation between variation of barometric pressure and sea level on the coast of Japan, which were noticed in Nature of November 3, 1904, has been continued by Prof. Omori, who shows, in the *Proceedings of the Tokyo Physicomathematical Society* (vol. ii., No. 20), that the relationship found on the Pacific extends to the western coasts of Japan, so that all round these islands the rise of sea-level is greater than that due to the local diminution of barometric pressure alone. The consequence of this is that a low barometer means a decrease of pressure on land but an increase of pressure on the surrounding sea bottom, the latter being about 1·6 times as great as the former. An interesting result, attributed to this cause, is given in No. 21 of the *Publications of the Earthquake Investigation Committee,* where the behaviour of a horizontal pendulum during the storm of October 10–11, 1904, is described; the low-pressure area passed to the east of Tokyo, and during its passage the horizontal pendulum indicated a tilting, which reached 3·5 seconds of arc, to the east—that is, in the direction of the low barometric pressure—indicating an increase of pressure on the sea bottom in that direction.

WE have received the report of the Government Observatory, Bombay, for the year 1904. This observatory deals chiefly with terrestrial magnetism, meteorology, and seismology; it has issued a long series of valuable publications, and many years ago Mr. Charles Chambers, then director, prepared an elaborate discussion of the meteorology of Bombay. The care bestowed upon the records of the photographic self-registering instruments may be gathered from the fact that the watchmen go round once every hour, night and day, to see that the clocks are all going and the lights burning. Their regular attendance is automatically recorded on the photograms themselves. The total rainfall for the year amounted to only 33·4 inches, being 41·7 inches below the normal value for twenty-four years (1873–96); this is the smallest fall recorded at the observatory. Milne's seismograph registered thirty-five earthquakes during the year.

FROM information received from the president of the International Aëronautical Committee, we find that in the months of January to April last the average monthly number of stations participating in the balloon and kite ascents was sixteen; kite observations were made each month at Oxshott by Mr. Dines, and at Aldershot, by the military balloon section, in February and March. The most notable heights attained, by means of unmanned balloons, were 19,420 metres at Strassburg and 21,733 metres at Berlin. In April kite and unmanned balloon observations were made from the Prince of Monaco's yacht in the Mediterranean. These are the first ascents made with unmanned balloons in the open sea, and these successful experiments show that Prof. Hergesell's idea of obtaining such observations over the oceans may possibly be realised.

BULLETIN No. 35 of the Storrs Agricultural Experiment Station, Conn., deals with the Camembert type of soft cheese. The conclusion is arrived at that the ripening is due to definite moulds and bacteria. One mould (? *Penicillium candidum*) seems to produce the changes which result in the texture of the cheese, and it, together with the *Oidium lactis,* produces the flavour, lactic acid bacteria giving the necessary acidity and retarding the action of other bacteria. It is found possible so to control the process of ripening that the desired result may be obtained with reasonable uniformity.

WE have received the first number of a new periodical, the *Medico-technologisches Journal,* edited by Dr. Berthold Beer, which is to be devoted to medical and surgical instruments and the various apparatus employed in bacteriology, photography, radiography, hygiene, &c., and appertaining to the medical sciences and physical therapeutics. It contains a prefatory article by Dr. Beer, and descriptions of Zeiss's apparatus for the demonstration of ultramicroscopic particles and of various surgical instruments and pharmaceutical preparations, together with photographic and balneological notes and new literature. Such a journal, provided it gives concise descriptions of the principal new inventions of the various countries, and not of Germany only, should supply a decided want.

IN a paper contributed to the June number of the *Zoologist* Mr. J. G. Millais points out that the English black rat—the type of *Mus rattus* of Linnæus—is by no means the blackest representative of the species, that distinction falling to a race which it is proposed to call *M. rattus ater,* and of which specimens have been taken in England. No doubt this is right enough, but when the author proceeds to suggest English names for the various local races of the species in question he follows a course which, in our opinion, cannot but land him in difficulties. The species itself he rightly calls the black rat, but for its local races the name of Alexandrine rat is taken, so that the typical form becomes the northern Alexandrine rat, while the new race is termed the black Alexandrine rat. Their proper designations should be the Alexandrine black rat and the Black Sea black rat.

IN the *Transactions of the Royal Society of Edinburgh* (vol. iii., part iii., No. 22) Sir Charles Elliot describes the nudibranch molluscs collected during the Scottish National Antarctic Expedition. These comprise but two species, two of which are, however, referable to new and interesting generic types. The most remarkable feature is the absence in the collection of all representatives of Doris and its allies, a feature common to the *Discovery* collection of this group, which has been entrusted to the author for description. Certain holothurians of the genus Psolus from the Antarctic present a superficial resemblance to dorids, although this is not regarded as more than accidental.

As a supplement to part iii. of Prof. Herdman's report on the pearl oyster fisheries of the Gulf of Manaar, published by the Royal Society, Messrs. Shipley and Hornell describe several new parasitic worms (some referred to new generic types) obtained from elasmobranch fishes frequenting the pearl-banks. Possibly, although not probably, some of the cestodes may be the parent form of the pearl-producing larvæ. No direct light is thrown by the investigations on the problem of the *provenance* of the pearl-producing parasite.

THE departmental committee appointed to investigate certain matters connected with the sea-fisheries of Sutherland and Caithness reports that cod and ling have of late years been much less abundant than formerly on the coast. As regards a proposed close time for herrings, it was considered that the fishermen themselves are the best judges as to whether such a protective measure is advisable. Trawling in the Moray Forth (which is not permitted to British craft) by foreign vessels is held to be responsible for considerable injury to the fishery.

ACCORDING to the report for 1904, the Marine Biological Association of the West of Scotland has had a very successful year, the only drawback being certain difficulties with regard to the staff. The year witnessed the practical completion of the large extensions of the station generously provided by Mr. J. Coats, jun., which were opened by Sir John Primrose in September last, and promise to meet all present requirements. The hope is expressed that it may be found possible to retain the invaluable services of the S.Y. *Mermaid* during the present season.

Nos. 4 and 5 of the admirable series of Cold Spring Harbour Monographs are respectively devoted to the life-history of the chrysomelid beetle *Chlamys plicata*, commonly called "case-bearer," and of the "mud-snail" (dog-whelk), *Nassa plicata*, E. M. Briggs and A. C. Dimon being the respective authors, or, as some would say, authoresses. The case-bearer is remarkable for the fact that its encased larvæ resemble not only undeveloped buds of the alder, but likewise the fruit of the high-vine blackberry. Of the "mud-snail" the life-history and habits are described in considerable detail, and a number of observations recorded with regard to its reactions to light. &c.

Two addresses, on "Spirals" and "Ambidexterity," which were delivered before the Hampstead Scientific Society by Sir Samuel Wilks, Bart., F.R.S., on April 14 and May 12 respectively, have just been issued in pamphlet form by Mr. S. C. Mayle, of Hampstead. The society is to be congratulated on having the active support of so eminent a man as Sir Samuel Wilks.

At the meeting of the Aëronautical Society of Great Britain to be held on Wednesday next, the following communications will be read:—"Some Remarks on Aërial Flight," by G. H. Wenham; "Demonstration of a Bird-like Flying Machine," by Dr. F. W. A. Hutchinson; "Balloon Varnishes and their Defects," by W. F. Reid; and "The Thrust of Aërial Propellers," by W. G. Walker.

## OUR ASTRONOMICAL COLUMN.

Observations of the Satellites of Saturn and Uranus.—An important set of observations of the satellites of Saturn and Uranus, involving some hundreds of individual "settings," was made by Messrs. Frederick and Hammond with the 26-inch equatorial of the U.S. Naval Observatory during 1904. The position angle and distance of each satellite were measured from a second satellite, the angle about the inner body always being taken. The observations extended over the period May 24 to October 11, and the detailed results are published in No. 4026 of the *Astronomische Nachrichten*.

Geodetic Measurements from Solar Eclipses.—The *Journal of the British Astronomical Association* (vol. xv., June 22) contains a paper in which Mr. C. E. Stromeyer points out that if the central shadow of the coming August eclipse be accurately located, all the necessary data will be available for the determination of the geocentric difference of any two observation stations. He proposes two methods for eye observations, and two photographic methods, of which one in particular seems capable of being carried out with the desired precision; it consists in photographing a trail of the central phase of the eclipse on to a moving film.

The method described can be carried out both within and outside the shadow, but the best results will be obtained if the observer is just on the edge of the shadow. The method can also be used with annular eclipses, and if found to be trustworthy would be a valuable means for gradually determining the geocentric distances of various points, even of islands in mid-ocean, which can never be triangulated.

Monochromatic Photographs of the Orion Nebula.—On obtaining a series of spectrograms of the Orion nebula with a small objective-prism quartz spectrograph, Prof. Hartmann found that different parts of the nebula emit light of very different composition, whilst large areas, of characteristic forms, shine solely by the ultra-violet radiation at $\lambda$ 3727. This variety of the light emitted by the several areas of the nebula led Prof. Hartmann to employ colour screens in obtaining direct photographs with a Steinheil reflector of 24 cm. aperture and 90 cm. focal length. Three screens were used; the first completely absorbed all wave-lengths shorter than $\lambda$ 4800, but allowed H$\beta$ and the two chief nebular lines, $N_1$ and $N_2$, to pass through almost without any diminution of intensity. The second screen freely transmitted all radiations between $\lambda$ 3880 and $\lambda$ 3740, but absorbed all others, whilst with the third the absorption commenced at $\lambda$ 5050, increased rapidly to totality at H$\beta$, extended to $\lambda$ 4000, and then quickly decreased until at $\lambda$ 3727 the transparency was very nearly complete. In this screen the two chief nebular lines were faintly transmitted, but it was an easy matter to eliminate their action by employing a plate of suitable sensitiveness. Combining the first and third screens cut out H$\beta$, leaving only $N_1$ and $N_2$ effective.

Marked differences of the intensities of several areas, as shown on the various photographs obtained with different screens, are plainly seen on the reproductions accompanying Prof. Hartmann's paper. Evidently the radiation $\lambda$ 3727 is extraordinarily intense in *all* parts of the nebula, whilst in some parts it is almost the sole radiation, producing strong photographic images where the eye sees nothing. The nebula G.C. 1180 surrounding the star *c* Orionis is scarcely visible on the $N_1$ and $N_2$ photograph, but it is a prominent feature on that obtained with the ultra-violet light, and is fairly bright on the H$\beta$ plate.

This differential action suggests to Prof. Hartmann the presence of at least *three* gases in the Orion nebula, one of which emits the chief nebular radiations, the second hydrogen, and a third, which emits the radiation at $\lambda$ 3727 (*Astrophysical Journal*, No. 5, vol. xxi.).

Periodicity of Aërolite Falls.—Among a number of interesting papers published by the Royal Astronomical Society of Canada ("Selected Papers and Proceedings," 1904) we notice one by Mr. W. H. S. Monck in which the author suggests that aërolites, like meteors, effect a certain periodicity. He first shows that the months of May and June stand out prominently in his catalogue of aërolites as the two months of the year in which a greater proportion of known falls have taken place. The number per diem for these two months is 1·34, whilst for the rest of the year it is only 0·81.

In an argument supporting the suggested periodical relation between various aërolite falls, Mr. Monck cites instances in which (1) aërolites fell within one or two days of each other in the same year; (2) aërolites fell on almost the same date in two consecutive years; (3) aërolites fell on nearly the same date after an interval of two or three years; and the number of cases quoted seems to place the matter beyond one of chance coincidences. Further, an analysis of the catalogue dates and numbers indicates a marked tendency for series of falls to congregate about certain dates, and for these falls Mr. Monck tentatively deduces periodicities varying from seven to twenty years.

The Reality of Supposed Changes on the Moon's Surface.—In a paper published in the June number of the *Bulletin de la Société astronomique de France* M. Puiseux discusses at some length the various observations of alleged changes on the lunar surface under the influence of the solar radiation. Going back to the earliest observations of details, he carefully considers each authoritative report of suspected change up to the most recent observations of the reported increase of the diameter of Linné during lunar eclipses. Summing up all the evidence thus examined, M. Puiseux arrives at the conclusion that the case for real changes taking place on the surface of our satellite is not established. He believes that the change of sensitiveness of the retina when observing faint objects is sufficient to account for the changes visually observed, whilst the different conditions of exposure when photographing the eclipsed moon might easily introduce the changes suspected from the examination of photographs.

The Circumzenithal Apparatus.—A new circumzenithal apparatus, devised by MM. Nušl and Frič for the determination of latitude, &c., was briefly described in these columns for August 20, 1903. A full and illustrated description of the instrument, and of the various improvements suggested by experience in its use, is now given in the Bulletin International of the Académie des Sciences de François Joseph I. (Prague, 1904) by the inventors, together with a detailed account of the observations already made and the methods employed in reducing the same.